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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/758,452
Filing Date: January 15, 2004
Appellant(s): DELASHMIT ET AL.

Jeffrey A. Pyle
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 5/18/2007 appealing from the Office action mailed 3/9/2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

- The appellant's statement of the grounds of rejection to be reviewed on appeal is incorrect. On page 15, it is stated, "B. Claims 75-75 are definite". Claims 74-75 had been rejected under U.S.C. 112, 2nd paragraph for insufficient antecedent basis not for indefinite. Rejection hereby has been withdrawn.

- Claims 1-2, 4, 7, 10-11, 16-20, 23-46, 52-55, and 58-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller et al., herein Mueller, (U.S. Pub. 2003/0071194 A1) in view of the applicants' admitted prior art, herein AAPA, disclosed on page 1 of the instant application in the U.S. Pub. 2005/0157931 A1.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

- Muller et al., U.S. Pub. 2003/0071194 A1.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was

commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 4, 7, 10-11, 16-20, 23-46, 52-55, and 58-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mueller et al., herein Mueller, (U.S. Pub. 2003/0071194 A1) in view of the applicants' admitted prior art, herein AAPA, disclosed on page 1 of the instant application.

1. As per claim 1, Mueller teaches a method for modeling an object in software, comprising:

   Generating a three-dimensional geometry of the object from a plurality of points obtained from a plurality of images of the object, the images having been acquired from a plurality of perspectives (p. 3, paragraphs 0049-0050); and

   Generating a three-dimensional model from the three-dimensional geometry (p. 3, paragraphs 0049-0050)

   But does not teach for integration into an object recognition system.

   The AAPA teaches this feature (p. 1, paragraphs 0004 and 0006).

   It would have been obvious to one of ordinary skill in the art to combine the teachings of Mueller and AAPA. AAPA's teachings would have provided the ability to automatically, and quickly view and classify objects (AAPA, p. 1, paragraph 0004).

2. As per claim 2, Mueller teaches creating the three-dimensional geometry includes generating the three-dimensional geometry of the object from a plurality of points obtained from a plurality of two-dimensional images of the object (p. 5, paragraph 0064).

3. As per claim 4, Mueller teaches generating the set of three-dimensional data includes:

Selecting a plurality of points in each of the two-dimensional images (p. 5, paragraph 0065);

Calibrating the relationship between the images from selected points that are co-located in more than one of the two-dimensional images (p. 120, paragraph 0120. The teachings of calibration using objects of high textual contrast to identify 3D calibration points to integrate images is regarded as calibrating the relationship between the images from selected points that are co-located in more than one of the two-dimensional images); and

Mapping the selected points in the calibrated two-dimensional images into a three-dimensional space (p. 5, paragraph 0065).

4. As per claim 7, the discussions in claim 4 inherit these limitations. They are, therefore, rejected for the same reasons.

5. As per claim 10, the discussions in claim 1 inherit these limitations. They are, therefore, rejected for the same reasons.

6. As per claim 11, Mueller teaches generating the surface geometries includes connecting the three-dimensional data to planar curves (p. 5, paragraph 0065. Mueller's teaching of

generating 3-D surface data from a set of represented by a regular array of points is regarded as connecting the three-dimensional data to planar curves).

7. As per claim 16, Mueller teaches generating the three-dimensional model from the three-dimensional geometry includes:

Rotating the three-dimensional geometry (p. 3, paragraph 0050); and

Generating a plurality of synthetic signatures of the model from a plurality of perspectives at the three-dimensional geometry is rotated (p. 11, paragraph 121).

8. As per claim 17, Mueller teaches generating the synthetic signatures comprises generating a plurality of synthetic LADAR signatures (The signatures discussed in claim 16 is generated using a LADAR system, so they are regarded as LADAR signatures).

9. As per claim 18, these limitations have already been discussed in claim 10. They are, therefore, rejected for the same reasons.

10. As per claim 19, these limitations have already been discussed in claim 2. They are, therefore, rejected for the same reasons.

11. As per claim 20, Mueller teaches the images comprise laser radar images (p. 3, paragraph 0049; and p. 13, paragraph 0146).

12. As per claim 23, these limitations have already been discussed in claim 22. They are, therefore, rejected for the same reasons.

13. As per claim 24, these limitations have already been discussed in claim 1. They are, therefore, rejected for the same reasons.

14. As per claim 25, these limitations have already been discussed in claim 2. They are, therefore, rejected for the same reasons.

15. As per claim 26, these limitations have already been discussed in claim 10. They are, therefore, rejected for the same reasons.

16. As per claim 27, these limitations have already been discussed in claim 12. They are, therefore, rejected for the same reasons.

17. As per claim 28, these limitations have already been discussed in claim 16. They are, therefore, rejected for the same reasons.

18. As per claim 29, these limitations have already been discussed in claim 18. They are, therefore, rejected for the same reasons.

19. As per claim 30, these limitations have already been discussed in claim 19. They are, therefore, rejected for the same reasons.

20. As per claim 31, these limitations have already been discussed in claim 20. They are, therefore, rejected for the same reasons.

21. As per claim 32, these limitations have already been discussed in claim 21. They are, therefore, rejected for the same reasons.

22. As per claim 33, these limitations have already been discussed in claim 23. They are, therefore, rejected for the same reasons.

23. As per claim 34, the discussions in claim 1 inherit these limitations. They are, therefore, rejected for the same reasons.

24. As per claim 35, these limitations have already been discussed in claim 2. They are, therefore, rejected for the same reasons.

25. As per claim 36, these limitations have already been discussed in claim 10. They are, therefore, rejected for the same reasons.

26. As per claim 37, these limitations have already been discussed in claim 12. They are, therefore, rejected for the same reasons.

27. As per claim 38, these limitations have already been discussed in claim 16. They are, therefore, rejected for the same reasons.

28. As per claim 39, these limitations have already been discussed in claim 18. They are, therefore, rejected for the same reasons.

29. As per claim 40, these limitations have already been discussed in claim 19. They are, therefore, rejected for the same reasons.

30. As per claim 41, these limitations have already been discussed in claim 20. They are, therefore, rejected for the same reasons.

31. As per claim 42, these limitations have already been discussed in claim 21. They are, therefore, rejected for the same reasons.

32. As per claim 43, these limitations have already been discussed in claim 23. They are, therefore, rejected for the same reasons.

33. As per claim 44, these limitations have already been discussed in claims 1 and 2. They are, therefore, rejected for the same reasons.

34. As per claim 45, these limitations have already been discussed in claim 2. They are, therefore, rejected for the same reasons.

35. As per claim 46, these limitations have already been discussed in claim 4. They are, therefore, rejected for the same reasons.

36. As per claim 52, these limitations have already been discussed in claim 10. They are, therefore, rejected for the same reasons.

37. As per claim 53, these limitations have already been discussed in claim 11. They are, therefore, rejected for the same reasons.

38. As per claim 54, these limitations have already been discussed in claim 12. They are, therefore, rejected for the same reasons.

39. As per claim 55, these limitations have already been discussed in claim 13. They are, therefore, rejected for the same reasons.

40. As per claim 58, these limitations have already been discussed in claim 16. They are, therefore, rejected for the same reasons.

41. As per claim 59, these limitations have already been discussed in claim 17. They are, therefore, rejected for the same reasons.

42. As per claim 60, these limitations have already been discussed in claim 20. They are, therefore, rejected for the same reasons.

43. As per claim 61 these limitations have already been discussed in claim 21. They are, therefore, rejected for the same reasons.

44. As per claim 62, these limitations have already been discussed in claim 22. They are, therefore, rejected for the same reasons.

45. As per claim 63, these limitations have already been discussed in claim 23. They are, therefore, rejected for the same reasons.

46. As per claim 64, Mueller teaches a method for modeling an object in software, comprising:

generating a three-dimensional geometry of the object from a plurality of points obtained from a plurality of images of the object, the images having been acquired from a plurality of perspectives (p. 3, paragraphs 0049-0050), including:

generating a preliminary three-dimensional geometry from object from the images to define a three-dimensional space (p. 2 paragraph 0014); and

generating the three-dimensional geometry from the images, the three-dimensional geometry being defined within the three-dimensional space (p. 3, paragraphs 0049-0050);

but does not teach the 3-D model generated for integration into an object recognition system.

The AAPA teaches this feature (p. 1, paragraphs 0004 and 0006).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Mueller and AAPA. AAPA's teachings would have provided the ability to automatically, and quickly view and classify objects (AAPA, p1, paragraph 0004).

59. As per claim 65, these limitations have already been discussed in claim 4. They are, therefore, rejected for the same reasons.

60. As per claim 66, these limitations have already been discussed in claim 7. They are, therefore, rejected for the same reasons.

61. As per claim 67, these limitations have already been discussed in claim 9. They are, therefore, rejected for the same reasons.

62. As per claim 68, Mueller teaches generating the three-dimensional model includes generating a three-dimensional model of LADAR returns from the object (p. 3, paragraph 0049; and p. 13, paragraph 0146).

63. As per claim 69, the AAPA teaches integrating generated model into a target recognition system (AAPA, p. 2, lines 15-17 and 20-25).

64. As per claim 70, Mueller teaches using microprocessor to perform a method of modeling an object using software (p.5, paragraph 0062). This teaching inherits a program storage medium with instructions that, when executed by a computing device, perform a method for modeling an object in software. The limitations have already been discussed in claim 64. They are, therefore, rejected for the same reasons.

65. As per claim 71, these limitations have already been discussed in claim 4. They are, therefore, rejected for the same reasons.

66. As per claim 72, these limitations have already been discussed in claim 68. They are, therefore, rejected for the same reasons.

67. As per claim 73, Mueller teaches:

a processor (fig. 2);

a bus system (fig. 2);

a storage with which the processor communicates over the bus system (fig. 2 and p.5, paragraph 0062);

a software application residing in the storage and capable of performing a method for modeling an object in software upon invocation by the processor (p.5, paragraph 0062), the method comprising:

generating a three-dimensional geometry of the object from a plurality of points obtained from a plurality of images of the object, the images having been acquired from a plurality of perspectives (p. 3, paragraphs 0049-0050), including:

generating a preliminary three-dimensional geometry from object from the images to define a three- dimensional space (p. 2 paragraph 0014); and

generating the three-dimensional geometry from the images, the three-dimensional geometry being defined within the three-dimensional space (p. 3, paragraphs 0049-0050); and

but does not teach the 3-D model generated for integration into an object recognition system.

The AAPA teaches this feature (p. 1, paragraphs 0004 and 0006).

It would have been obvious to one of ordinary skill in the art to combine the teachings of Mueller and AAPA. AAPA's teachings would have provided the ability to automatically, and quickly view and classify objects (AAPA, p1, paragraph 0004).

68. As per claim 74, these limitations have already been discussed in claim 4. They are, therefore, rejected for the same reasons.

69. As per claim 75, these limitations have already been discussed in claim 68. They are, therefore, rejected for the same reasons.

70. As per claim 76, these limitations have already been discussed in claims 64 and 68. They are, therefore, rejected for the same reasons.

71. As per claim 77, these limitations have already been discussed in claims 69. They are, therefore, rejected for the same reasons.

72. As per claim 78, these limitations have already been discussed in claim 16. They are, therefore, rejected for the same reasons.

73. As per claim 79, Mueller teaches using microprocessor to perform a method of modeling an object using software (p.5, paragraph 0062). This teaching inherits a program storage medium with instructions that, when executed by a computing device, perform a method for modeling an object in software. The limitations have already been discussed in claim 76. They are, therefore, rejected for the same reasons.

74. As per claim 80, these limitations have already been discussed in claim 69. They are, therefore, rejected for the same reasons.

75. As per claim 81, these limitations have already been discussed in claim 16. They are, therefore, rejected for the same reasons.

76. As per claim 82, these limitations have already been discussed in claims 73 and 75. They are, therefore, rejected for the same reasons.

77. As per claim 83, these limitations have already been discussed in claim 69. They are, therefore, rejected for the same reasons.

78. As per claim 84, these limitations have already been discussed in claim 16. They are, therefore, rejected for the same reasons.

(10) Response to Argument

79. Applicant's arguments, filed 5/18/2007 see pages 15-16,with respect to the U.S.C. 112, 2nd paragraph rejections for insufficient antecedent basis of claims 74-75 have been fully considered and are persuasive. The U.S.C. 112, 2nd rejections for insufficient antecedent basis of claims 74-75 have been withdrawn.

80. Applicant's arguments, 5/18/2007 see pages 11-15, regarding claims 1-2, 5, 7, 10-11, 16-20, 23-46, 52-55, and 58-84 have been fully considered but they are not persuasive. The Applicant argues that Mueller is:

- Non-analogous art. The Examiner respectfully disagrees. Mueller teaches an invention that develops a 3-D model of an object from a plurality of scanned images in paragraph 0011 on pages 1-2 and paragraph 0049 page 3:

> [0011] In one embodiment, the present invention provides a three dimensional digital scanner which includes a multiple view detector which is responsive to a broad spectrum of visible light. The multiple view detector is operative to develop a plurality of images of a three dimensional object which is being scanned. The plurality of images are taken from a plurality of relative angles with respect to the object, and the plurality of images depict a plurality of surface portions of the object. A digital processor including a computational unit is coupled to the detector and is responsive to the plurality of images

> so that it develops 3-D coordinate positions and related image information for the plurality of surface portions of the object. A three dimensional image of the object to be scanned is thus developed by the digital processor. The data developed includes both shape and surface image color information.
>
> [0049] In FIG. 1, an embodiment of the present invention includes a system for obtaining a series of two dimensional color images of an object and processing those images to obtain a three dimensional model of the surface of the object. An object 100 which is to be digitized is placed on a rotatable platform 102. A motor 104 is provided to drive rotatable platform 102 via a shaft 106. A position encoder 108 detects the angular position of rotatable platform 102 and generates an electrical signal which represents the angular position of rotatable platform 102. An optical detector 110 (e.g. a color video camera) views object 100 and creates a two dimensional color image of object 100.

and the Applicant's admitted prior art, hereinafter the AAPA, teaches generating geometrical model of an object for integration into an ATR system on the specification's page 1 paragraphs 0004 and 0006:

> [0004] One valuable use for automated technologies is "object recognition." Many diverse fields of endeavor value the ability to automatically, accurately, and quickly view and classify objects. For instance, many industrial applications sort relatively large numbers of parts, which may be an expensive, time-consuming task if performed manually. As another example, many military applications employ autonomous weapons systems that need to be able to identify an object as friend or foe and, if foe, whether it is a target.
>
> [0006] In a geometry-matching type of approach, the model may be developed in a variety of ways. The model may be developed by actually remotely sensing the geometry of an exemplary object in a controlled setting. More typically, the model is developed in a two step process. The first step is to measure the geometry of an exemplary object. The second step is to emulate the patterns of received radiation that would be received from the measured geometry should the exemplary object actually be remotely sensed. For instance, if the remote sensing technology is a laser radar, or "LADAR" system, this second step applies a "ray tracing" package to the measured geometry. The ray tracing package is a software-implemented tool that emulates remotely sensing the exemplary object by calculating the patterns of the returns that would be received if the exemplary object were actually remotely sensed.

It would have been obvious to one of ordinary skill in the art to combine the teachings of Mueller and AAPA. AAPA's teachings would have provided the ability to automatically, and quickly view and classify objects (AAPA, p1, paragraph 0004 as recited above).

In addition, the Applicant argues that Applicant was addressing the difficulty of developing synthetic 3D images of vehicles for use in an automatic target recognition ("ATR") system. More particularly, Applicants were addressing the difficulty posed in the prior art by having to have the vehicle present. Mueller et al. is about getting the color correct in a two-dimensional, scanned image of a three-dimensional object. These are two very different purposes, and "the inventor(s) would accordingly have less motivation or occasion to consider it." There is no reason to seek a 3D synthetic modeling technique for a 3D object for embedment in an ATR in a reference on producing correct color in a two-dimensional scanned image. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., addressing the difficulty of developing synthetic 3D images of vehicles) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181. The features in the claim(s) only claim generating a 3-D geometry of the object from a plurality of images of the object and generating a 3-D model from the 3-D geometry for integration into an object recognition system, and the combination of Mueller and the AAPA address exactly what is claimed.

The Applicant also argues that there is no reason to seek a 3D synthetic modeling technique for a 3D object for embedment in an ATR in a reference on producing correct color in a two-dimensional scanned image. In response to this argument, the Examiner would like to remind the Applicant that the Mueller prior art is about developing a 3-D model of an object from a plurality of scanned images, as recited in paragraph 0011 on pages 1-2 and paragraph 0049 on page 3 below,

which, in combination with the AAPA, reads onto the claimed invention by the instant application regardless of additional teachings by Mueller. Therefore, these two in combination are definitely analogous.

> [0011] In one embodiment, the present invention provides a three dimensional digital scanner which includes a multiple view detector which is responsive to a broad spectrum of visible light. The multiple view detector is operative to develop a plurality of images of a three dimensional object which is being scanned. The plurality of images are taken from a plurality of relative angles with respect to the object, and the plurality of images depict a plurality of surface portions of the object. A digital processor including a computational unit is coupled to the detector and is responsive to the plurality of images so that it develops 3-D coordinate positions and related image information for the plurality of surface portions of the object. A three dimensional image of the object to be scanned is thus developed by the digital processor. The data developed includes both shape and surface image color information.
>
> [0049] In FIG. 1, an embodiment of the present invention includes a system for obtaining a series of two dimensional color images of an object and processing those images to obtain a three dimensional model of the surface of the object. An object 100 which is to be digitized is placed on a rotatable platform 102. A motor 104 is provided to drive rotatable platform 102 via a shaft 106. A position encoder 108 detects the angular position of rotatable platform 102 and generates an electrical signal which represents the angular position of rotatable platform 102. An optical detector 110 (e.g. a color video camera) views object 100 and creates a two dimensional color image of object 100.

- Teaching away. The Applicant argues that Mueller teaches that circumstance, which is precisely the problem Applicants are trying to overcome, is the preferable approach. Indeed, one circumstance that the present invention seeks to address is the situation in which the object to be modeled cannot actually be brought to the equipment that is to do the modeling. Mueller, therefore, teaches away from Applicants' invention. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., addressing the difficulty of developing synthetic 3D images of vehicles) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181.

- Mueller and the AAPA improperly combined. The Applicant argues that Mueller teaches away from the present invention. Hence, there cannot be motivation or suggestion to combine references. As discussed in the bullets above about non-analogous art and teaching away, Mueller is an analogous art and does not teach away from the invention of the instant application. Hence, they are properly combined.

Claims 1-2, 5, 7, 10-11, 16-20, 23-46, 52-55, and 58-84, therefore, remain rejected.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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